



# CANYONS & CAVES

A Newsletter from the Resources Stewardship & Science Division

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Art Fortini in Zanzibar, an area discovered in 1999 off the Western Borehole in Lechuguilla Cave. Exploration in this area in 2003 led to the discovery of The Promised Land chronicled in an article beginning on page 11. Note that Art has donned clean boot covers to travel through this area. (Photo © Daniel Chailloux)

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Look for Issues of *Canyons & Caves* at the following websites:  
<http://www.nps.gov/cave/pub-pdf.htm> Thanks to Kelly Thomas and Bridget Eisfeldt all issues can be downloaded as a PDF file from the park website.  
<http://www.caver.net/> Once there, go to the Canyons & Caves icon. Bill Bentley has placed all issues on his personal website and can also be downloaded as PDF files.

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## RESOURCE NEWS

**CARLSBAD CAVERN RESOURCE PROTECTION PLAN**  
– It only took four years, but this important plan for the long-term protection of Carlsbad Cavern is finally completed. A Finding of No Significant Impact (FONSI) was signed by the Acting Regional Director on Wednesday, Sept. 3, 2003. Special thanks to Paul Burger for pushing this plan to completion.

**CONGRATULATIONS DIANE!** – Biologist **Diane Dobos-Bubno** is moving on to a promotion as the team liaison for the newly created Colorado Plateau Exotic Plant Management Team. She will be based out of Petrified Forest National Park in scenic northeast Arizona. During her seven years at CCNP, Diane has been our rare, threatened, and endangered species coordinator, and has worked on exotic plants, preservation and

management of Oak and Rattlesnake Springs, fire management planning, revegetation, and lots of other projects. She also served as park Accessibility Coordinator, as chair of a housing committee, and as a trained First Responder. Best of luck, Diane—you will be missed.

**GOOD-BYE, GREAT BIOTECHS** – Also this fall, we're saying farewell to an outstanding crew of biological technicians. Finishing their seasons with us at the end of September are **Donna Laing** (cougar DNA project), **Anita Swanson** (bird nesting monitoring), **Kristin Dorman-Johnson** (native seed collection), and **Mike Woolman** (herpetological inventory). We will miss them all very much—their professionalism, dedication, cooperation, and humor have been outstanding contributions!

#### EBAY AUCTIONS OFF PIECES OF THE PARK

**Lechuguilla Cave** – On February 19, 2003, Alan Glennon reported that a cave pearl touted as being from Lechuguilla Cave was for sale on Ebay (a very popular internet auction site). Included with the auction item were pictures of the cave pearl and a picture of the cover of the March 1992 issue of the National Geographic that featured Lechuguilla Cave. The cave pearl was removed from the auction before it could be sold. Ebay has agreed to not allow cave formations to be sold on their website. Special agents for the National Park Service were notified and a subsequent investigation found that the cave pearl had originally come from a rock shop in Tennessee. The rock shop owner in Tennessee had the National Geographic article on Lechuguilla Cave next some cave pearls on sale for information about cave pearls. A discussion with the rock shop owner concluded that the cave pearl was from Tennessee and was not from Lechuguilla Cave. Thanks to Alan Glennon for notifying the park of this particular sale item on Ebay and thanks to the special agents for their efforts in the investigation.

**Carlsbad Cavern** – In a separate Ebay auction in August 2003, Rene Ohms informed us that a stalactite advertised to be from Carlsbad Cavern was on sale. After recently going through the process with the cave pearl, the park's Chief Ranger was informed who once again contacted a special agent for the NPS. An investigation found that the stalactite was recently acquired by the seller from an estate purchase. It was marked as being from Carlsbad Cavern and was auctioned as such. The stalactite was pulled from the auction before it was sold and is being returned to the park as a donation. Thanks to Rene for keeping us informed about speleothem sales on Ebay and to Mark and our special NPS agents for their quick and efficient investigations.

**BEEES AND MORE BEEES** – If Renee West seems a little cross-eyed these days, she comes by it honestly. In August, West attended the two-week Bee Course sponsored by the American Museum of Natural History in southeast Arizona. The course was a 'workshop for conservation biologists, pollination ecologists, and other biologists'. Students studied a huge variety of solitary, communal, and social bees, some so tiny they're barely visible to the unaided eye. Days were long, with lectures morning and evening. Afternoons were filled with field trips and lots and lots of microscope time, with even

more microscope time at night—looking at bee tongues and toes and other tiny parts. The 20 students this year were mostly entomology types. There were two botanists in the group (West included) and one very talented bee aficionado and artist. It was quite a challenge for us, but we all survived to stride beneath the arch of crossed insect nets and receive our diplomas. Both the bee collection and the diploma are available for viewing (and adoration!) upon request.

### WHEN IS A TOAD NOT A TOAD? (Scientific Names Can Be Fun)

by Renée West

Earlier this summer I was putting together a list of the known insects of CCNP. The list, far from being comprehensive, is compiled from various small studies and the park's meager museum collection. I found some interesting items, including a grasshopper called a toad hopper (or toad lubber)—an extremely odd-sounding thing. But then I realized I'd seen one in the park last summer—a strange fat thing that looked like a cross between a grasshopper and a toad, except that there could be no such critter. At least now I have a name for it.



The toad hopper is hard to spot in the park because of its cobble-like appearance. (NPS Photo by Dale Pate)

About that same time, I was working on an article for the last issue of this newsletter on harvester ants and horned lizards and their interconnectedness (the lizards eat the ants, you may remember). One day, Diane peeked over my shoulder and said something like, Hey, their scientific names are almost alike. I hadn't noticed, but it's true: the genus name for horned lizards (a.k.a., horny toads) is *Phrynosoma*, while the genus name for the toad hopper is *Phrynotettix*.

Now, I studied Latin for a few years and it serves me well in understanding lots of the scientific names. But Greek is another matter. So if it's not Latin, I turn to my trusty *Dictionary of Word Roots and Combining Forms* (Donald J. Borror, 1960) which illuminates many of the strange scientific names, making sense of them... mostly.

It turns out that in Greek, the term *phryno* means toad while *tettix* is grasshopper and *soma* means body. Hence, we have the toad (grass)hopper and the lizard with a 'toad body'. (Please don't ask me why we spend time teaching people that horny toads are not really toads but lizards, and then give them a scientific name of toad.)

Our most common horned lizard in the park is the Texas horned lizard, *Phrynosoma cornutum*. Since *cornut* is not a snack food, but is Latin for horned, we end up with a ‘horned toad body’—an apt description, until you consider that the other species of horned lizards are also horned... One of our toad hopper species is *Phrynotettix robustus*, with *robust* being Latin for strong. And it probably needs to be, since it is a flightless grasshopper and can only walk or jump away from danger.

You might wonder if the park’s real toads have scientific names with *phryno* in them. They don’t; they have various other genus names. I can’t answer why, but I can confuse the issue further by reporting that some of our frogs, not toads, have the genus name *Bufo*, which is Latin for toad. Go figure.

The Swedish scientist Linnaeus started the scientific naming system back in the 18th century. In addition to common names, every organism has to have a binomial—a two-part name consisting of a genus and species, written like *Homo sapiens*. These days there are lots of strict naming rules, somewhat different for plants than for animals, that provide a worldwide basis for scientific communication. Most often used are Latin and Greek words, but other languages and proper names also enter the picture.

Current rules say that you can’t name a plant or animal after yourself, but back in the old days, Linnaeus named a few for himself, including the twinflower of the genus *Linnaea*, which occurs across the Arctic in Linnaeus’ Sweden as well as Alaska and Siberia. However, nowadays when you see something named for a person, you can usually find that person in the history of the organism somewhere, either having discovered it or being prominent in biological exploration in the area.

For instance, we have a species of catclaw in the park called *Acacia roemeriana*, Roemer acacia. It happens that there are some Roemers around here now: a biologist on our staff (David) and a zoology professor at New Mexico State University (Gary). Both have worked on CCNP’s herpetological survey this summer, but neither is ancient enough or botanical enough to be the source of this name. The plant is probably named for Karl Roemer, a German botanist who collected plants in south Texas in the 19th century... Or maybe it was for Ferdinand von Roemer (1818-1891), a German scientist who spent 1845-47 exploring the flora and fauna of Texas. The plant was named by German botanist Georg Heinrich Adolf Scheele in 1849.

In general, scientific names really do make sense. Look at the coyote: *Canis latrans*. That’s directly out of Latin, meaning barking dog. And those clever little ringtails who sneak into everything and seem to climb vertical walls are called *Bassariscus astutus*. *Bassariscus* is Greek for fox and *astutus* is Latin for skilled: skilled as a fox.

The western pipistrelle bat is *Pipistrellus hesperus*. *Pipistrellus* is Italian for bat, and *hesper* is Greek for western or evening (when the sun sets in the west). The American cockroach has another great name: *Periplaneta americana*. But *periplaneta*

doesn’t mean cockroach. *Planet* is Greek for wanderer and *peri* means around: a bug that wanders around. Wander in Latin is *peregrin*, which turns up in the name for the peregrin falcon, *Falco peregrinus*. (At least *falco* is Latin for falcon!) The Oriental cockroach, *Blatta orientalis*, in Latin is ‘cockroach of the east’.

Sometimes the scientific names are easy and straightforward, like the Carlsbad cave cricket, *Ceuthophilus carlsbadensis*. *Ceutho* is hidden and *phil* means loving (Greek): a Carlsbad critter who loves being hidden—from light and predatory eyes, I suppose. The genus name for willow is *Salix*, which is Latin for willow. *Rhus* is Latin for sumac, also our genus name for sumac. When you combine that with the Greek words for small (*micro*) and leaf (*phyllum*), you get our common little-leaf sumac: *Rhus microphyllum*. In Latin, *juglans* means walnut. This time add *micro* and *carpa* (Greek for fruit) to get *Juglans microcarpa*, the little walnut.

Other names are long strings of word roots that aren’t necessarily accurate. The sotol plant, a desert member of the lily family, is *Dasyliirion leiophyllum*. The Greek roots are: *das* for shaggy, *lirio* for lily, *leio* for smooth, and *phyllum* for leaf: a shaggy lily with smooth leaves... Except we know the leaves are very sharp and jagged. (Is that like naming an icy island ‘Greenland’?)

Back in the world of bats, I’ve read that the common genus name *Myotis* comes from the Greek words *mys* (mouse) and *otis* (ear), referring to the long, pointed, leaf-like projection inside the ear: mouse-eared bats. And of course you’re wondering about the name for our big colony of Mexican free-tailed bats: *Tadarida brasiliensis mexicana*. Well, we don’t always know; sometimes original intentions are lost to history. The Georgia Museum of Natural History website (<http://museum.nhm.uga.edu>) says, “The genus name *Tadarida* is of uncertain origin, but may come from the Greek words *ta* and *darida* [long ones]. The name *brasiliensis* is a Latinized combination meaning ‘belonging to Brazil,’ the location of the first scientifically described individuals of this species.” (*Mexicana* is our subspecies that winters in Mexico.)

Even though scientists should be professional about these matters, sometimes personal feelings creep into the naming process. This can leave us with names that evoke strong mental images that tend to support people’s fears. The name for the western diamondback rattlesnake is *Crotalus atrox*. *Crotalu* makes sense as Greek for rattle, but to call this spectacular creature hideous or terrible (the meaning of *atrox* from Latin) seems unfair. Perhaps if I’d ever been bitten I’d feel differently... *Mephitis* in Latin means a foul odor. Our cute little striped skunk is named *Mephitis mephitis*, probably for extra emphasis on the odor. A common genus of mosquito is named *Aedes*, meaning disagreeable (in Greek). Hard to argue with that.

My personal favorite scientific name is that of our native wild vine called buffalo gourd or coyote melon: *Cucurbita foetidissima*. In Latin, *cucurbita* is a gourd, *foeten* means fetid or evil-smelling, and *-issima* is a superlative ending, meaning the most—the most evil-smelling gourd. Have you ever stuck



your nose in among its stinky leaves? You probably would agree.

## SELECTED CAVE SCIENCE SUMMARIES

*by Dale Pate*

### MICROBIAL RESEARCH

#### Medicinal Values

In the early to mid-1990s the park received a request from Larry Mallory to culture and study native microbes from Lechuguilla Cave. Dr. Mallory's initial studies in Mammoth Cave showed that there was more microbial activity in caves than first thought. Dr. Mallory was drawn to Lechuguilla Cave because it was newly discovered, so was less contaminated by humans and was very old (4-6 million years old), so very little organic material had washed into the cave system for a very long time. Dr. Mallory was given permission to place sterile glass and limestone slides into various pools for a length of time. When these slides were collected and analyzed, Dr. Mallory found approximately 1200 native microbe species, many showing certain qualities that warranted further research, particularly for medicinal values. Based on his findings, Dr. Mallory also likened native microbial diversity in Lechuguilla Cave as similar to what is found in a rain forest.



Limestone slides in a pool in the Western Branch. (NPS Photo by Stan Allison)

Over time, Dr. Mallory and his associates have begun research into anti-cancer and anti-fungal agents, antibiotics, and possible applications for treating malaria. One microbe from a pool in Lechuguilla Cave was discovered to excrete a chemical that has proved very promising in the fight against a specific type of human breast cancer. While the chemical is worth additional study, it is a long ways from providing a cure.

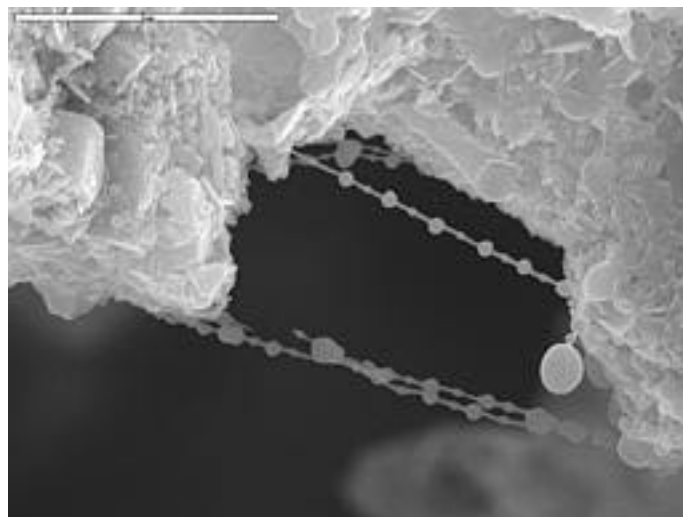
#### Lechuguilla – Mars Connection

After seeing a National Geographic Special featuring Lechuguilla Cave in 1993, scientists from the National Aeronautics and Space Administration (NASA) became intrigued with Lechuguilla Cave's microbial potential. NASA's Martian probes had already established that the

surface of Mars was too extreme for life to survive, but in the planet's underground, where water and warmth may still be found, life may still exist. As with Dr. Mallory's studies, NASA scientists found that Lechuguilla Cave with its pristine environment and little organic input over long periods of time would be an excellent model to aid in the search for life on Mars. Lechuguilla Cave was formed by sulfuric acid dissolution and left behind large deposits of gypsum and native sulfur along with its abundant iron, manganese, trace elements and clay deposits. Microbial life found in Lechuguilla would be more dependent on minerals for energy rather than organic materials. Any microbial systems found on Mars would have to derive energy from photosynthesis. Primary researchers for this effort were Penny Boston, Larry Lemke, and Chris McKay.

While no major NASA expeditions have taken place in Lechuguilla in a number of years, research continues on identifying potential biomarkers (minerals that have been created and deposited by microbes.) Caves provide places for microbes to flourish where larger animals and weather do not affect them. Some types of iron and manganese minerals are formed by microbes and because of little outside interference these microbes and their byproducts survive in cave environments. Ongoing studies in Lechuguilla and Spider Caves have shown that certain manganese minerals appear to be derived from microbial sources. While seemingly small steps, finding these particular minerals in the subsurface of Mars may indicate they were derived from a microbial source. Primary researchers for these ongoing studies have been Michael Spilde, Penny Boston and Diana Northup.

#### Life in Extreme Environments



A Scanning Electron Microscope image (9500X) of unknown bacteria bridging between rocks collected from red-brown corrosion residue in Snowing Passage in the Southwest Branch of Lechuguilla Cave. (Photo © Diana Northup & Mike Spilde) For more on this research visit the following website: <http://www.i-pi.com/~diana/slime/corrosion>

Lechuguilla and Spider Caves are unique in the Guadalupe Mountains in that they contain ferromanganese deposits called corrosion residues. These residues tend to be dark (though can vary greatly in color), are greasy to the touch, and in places coat the ceiling, walls and floors in these two caves and are

composed of manganese and iron oxides, rare earth minerals, clays and other minerals. A study was initiated by Diana Northup, Clifford Dahm, Penny Boston, Michael Spilde, and Laura Crossey to investigate how microbes are involved with the dissolution of the cave walls, what energy sources are available to these microbes, to identify any microbes associated with these deposits, and to characterize microbial community and species adaptations in these ecosystems. Some of the results of microbial DNA identification have shown numerous new organisms exist in the corrosion residues, including one whose closest known relatives are found in a deep gold mine in South Africa. Additional studies have shown that some microbes appear to be producing manganese precipitates only after a few weeks. Diana Northup has written her doctoral thesis on this ongoing study.

## BAT RESEARCH

### Anabat Echolocation Recorders

With the advent of Anabat echolocation recorders, it is possible to monitor bats in various locations. Matt Rahn has recently placed these recorders in several locations in Carlsbad Cavern as well as near several springs and cave locations to monitor bat use. These recorders are hooked up to data loggers and record data 24 hours a day, and will provide the park with essential data on bat use, particularly in Carlsbad Cavern, where human use is paramount. Knowing exact bat use can help management determine ways to protect bats while continuing the commercial operations in the cave. Preliminary investigations in Carlsbad Cavern with an Anabat recorder by Myra Barnes documented bat use in the Main Corridor of several bat species, including one not known from the park.

### Long-term Mexican Free-tailed Bat Population Trends



Jim & Val Werker taking infrared photos in Bat Cave – June 1996  
(Photo by Val & Jim Werker)

An ongoing research project has been to document the long-term stability of the colony of Mexican Free-tailed bats in Carlsbad Cavern. With the pesticide DDT playing a suspected role in the decline of the Mexican Free-tailed colony in the 1950s and 60s, the park has sought an accurate way to document the colony. Using permanently located photo-monitoring points, Jim & Val Werker since 1996 have been taking black and white infrared photographs of the bats while

in their roost. These photographs have been taken in early summer for 5 days in a row, mid-summer for 10 days in a row, and in late summer for another 5 days in row. The colony size can then be consistently estimated by measuring the area the bats cover in the roost and multiplying by 200 bats per square foot. This is a conservative number based on other research. Of note, the colony size varies from day to day throughout the summer based on a number of factors particularly how dry or wet conditions are in the local area. In order to avoid disturbing the bats while in their roost, the Werkers have developed and used low-intensity red filtered lights to find their way in Bat Cave and have used infrared film and flashes to photograph in the dark roost area.

## GEOLOGY/MINERALOGY RESEARCH

### Paleoclimatic Studies from Speleothem Deposition

There are two ongoing studies to reconstruct the climate record for the Late Pleistocene and the Holocene periods in the Southwestern portion of the United States by dating the mineral deposition from already broken stalagmites and studying the chemical variations in drip waters into Carlsbad Cavern during wet and dry periods. These studies are perfecting high precision techniques and are correlating what appear to be annual mineral growth bands with tree ring growth data. This climatic data appears to correspond with cultural events over the last 4,000 years in the desert southwest. Victor Polyak, Yemane Asmeron, and Jessica Rasmussen are working on these studies.

### Geology of Lechuguilla Cave and Related Caves

Long-term studies by Art and Peg Palmer are looking at the geologic and geochemical controls on the origin and development patterns from Lechuguilla Cave and other caves in the Guadalupe Mountains. Lechuguilla Cave and Carlsbad Caverns have been a major focus of this study. The development of individual cave passages and areas have been intensely studied as well as features that have developed since the caves actually formed.

## PALEONTOLOGY

### A Detailed Study of the extinct bat *Tadarida constantinei* from Slaughter Canyon Cave

The extinct bat *Tadarida constantinei* was described in 1960 from a Pleistocene bat guano deposit in Slaughter Canyon Cave. This deposit is the only known location for remains of this bat species. Other research has shown that the guano deposits in the cave are very old with the flowstone cap over the guano deposit being dated at least 210,000 years before present.

The purpose of this study is to review and evaluate the taxonomic status, age, and taphonomy (how the fossil assemblage formed) of this extinct species. Gary Morgan in 2002 excavated from two areas in the cave recovering thousands of bat bones including a number of intact skulls. Preliminary results indicate that *Tadarida constantinei* is a separate species and is about 20% larger than its close relative, the Mexican Free-tailed bat (*Tadarida brasiliensis mexicana*). It may also be that a large *Tadarida* bat of Pleistocene age

known from Mammoth Cave in Kentucky and Hamilton Cave in West Virginia are this species. During the excavation Dr. Morgan also recovered fossil remains of ten other vertebrates. These included the desert tortoise, a lizard, a snake, a large raptor, a species of *Myotis* bat, the desert cottontail rabbit, a pocket mouse, a woodrat, an extinct pronghorn antelope (*Capromeryx minor*), and a large carnivore (possibly the short-faced bear *Arctodus simus*). Dr. Morgan is scheduled to do one more excavation session this coming November.



Rick Toomey and Gary Morgan plan their excavation on an exposed face in a guano trench left over from guano mining days. (NPS Photo by Dale Pate)

## HYDROLOGY RESEARCH

### Infiltration Study at Carlsbad Cavern



NPS infrastructure surrounds the entrance to Carlsbad Cavern. (NPS Photo)

The General Management Plan that was completed for the park in 1995 mandated that a Infiltration Study be done to look at infiltration routes, possible contamination in Carlsbad Cavern, and to recommend mitigation measures to protect the cave from contaminants that may be entering the cave from

the NPS infrastructure build directly over it. This study was contracted to the Colorado School of Mines and was completed in 1997. Some contamination to Carlsbad Cavern from the overlying infrastructure was found and the study recommended a number of mitigative measures including the removal of the Bat Flight Parking lot and the removal of most of the maintenance facilities along with other functions and buildings that had the potential to contaminate the cave below.

### Bat Cave Draw Dye Trace

Paul Burger initiated this study to look at the time it takes for water runoff from the Bat Cave Parking lot to infiltrate into Carlsbad Cavern and which areas of the cave may be effected. On May 10, 2001 25,000 gallons of water laden with flourescein dye were released into Bat Cave Draw. Initial testing of pool waters detected small levels of flourescein in several pools before the dye was released. Flourescein dye is used in antifreeze and its detection in pools before any dye was released indicates that antifreeze had spilled onto the Bat Cave Parking lot and was infiltrating into the cave. Higher levels of flourescein dye were detected in drips in the Devil's Spring area of the Main Corridor after several small rains, but the drought conditions that have persisted since the dye was released have shown that large quantities of contaminants can be held in storage in the rocks above the known portions of the cave for long periods of time.



Waylon Cox, Stan Allison, and Tito Garcia mix freshwater with flourescein dye before the water flows into Bat Cave Draw. (NPS Photo by Paul Burger)

### Hydrology of Rattlesnake Springs

This study, completed in 1998, was initiated because of concerns over present and future oil and gas activities in the area of Rattlesnake Springs and possible contamination of this valuable water source. Erika Bowen determined that the spring is flowing from the conglomerate and alluvial fan from Slaughter Canyon. Recharge to Rattlesnake Springs (and several other springs along the Black River) occurs from high intensity, short duration rainstorms in Slaughter Canyon. Water flows through the gravel in the canyon and as it leaves the canyon, flows into several pathways within the gravel of the alluvial fan. These water pathways are well established and allow the spring outlets to remain in their current stable locations.





Rattlesnake Springs pond.

(NPS Photo by Dale Pate)

## HISPANIC HERITAGE MONTH 2003 TWO MEN SERVING OTHERS SAME LAST NAME

by Bob Hoff

*Hispanic Heritage Month*, with the theme *Hispanic Americans: Honoring Our Past, Surpassing Our Present and Leading Our Future*, starts September 15, 2003. During previous Hispanic Heritage Months, I researched details of **early Hispanic exploration** in future New Mexico, **Hispanic aid** for the American colonies during the American Revolution, **September 16, 1810** (the beginning of Mexico's independence from Spain), **Cinco de Mayo** (Mexico's victory against France at Puebla, Mexico, May 5, 1862), **Hispanic winners** of the US Congressional Medal of Honor, and **Hispanic contributions** to the present day world.

In this article, I am comparing the lives of two Hispanic men—Daniel Fernandez and Claude Fernandez (no relation). Though growing up in different places at different times, Daniel and Claude both served as young combat soldiers, both received combat awards, and both exemplified lives of service.

### Claude Suniga Fernandez

Claude Suniga Fernandez was born on December 22, 1922 in Carlsbad, New Mexico, graduated from Carlsbad High in 1940, and entered the army in January 1941. As a 20-year old sergeant stationed in Sicily, Claude wrote a letter in August 1943 to his brother Orlando in Santa Fe, saying in part,

*Dear Lando,  
Received your letter today and was very glad to hear from you. I hope that Mother and Dad enjoy their visit to Santa Fe. Tell her not to worry about me. Perhaps by now you have received my other letter where I told you I am in Sicily. All Carlsbad boys still o.k. We got the Germans on the run, so this thing can't last too long now, but they sure gave us hell for a while...Had a close shave the other day. A shrapnel from a German 88 m.m. went right through my*

*helmet. The helmet has two holes and I am going to do my best to bring it home, if and when. Still can't figure out how it missed my head. All I know is that God was with me at the moment and I pray he never leaves me. The German soldier is a damn good soldier, but no superman. There is nothing like an American soldier.*

Sergeant Claude Fernandez fought in WWII in Sicily, Italy, France, and Germany. He was discharged in June 1945 and was awarded the Purple Heart and Cluster. After the war, he attended the University of New Mexico. In June 1947 at age 24, Claude began a second career of uniformed service for the United States government, joining the National Park Service and receiving a temporary park guide job at Carlsbad Caverns. He received a permanent park guide job in April 1949.



Claude Fernandez, Supreme Court Justice William O. Douglas, Paul Webb  
(NPS Photo)

Thus began Claude's second career of service to others. His constantly high work ethic in the National Park Service earned him increased responsibility: he received promotions to Tour Leader (1952), to Supervisory Park Ranger (1956), and to Chief Park Guide (1968) at the caverns. In August 1971 he transferred to Fort Union National Monument near Las Vegas, New Mexico as Superintendent/ Park Manager. While at the Caverns he received a *Superior Performance Award* and a *Quality Increase Award*.

Claude devoted himself to job excellence, influencing all who worked with him. Mrs. Olive Johnson, now 88 years old who worked and supervised with Claude said that Claude believed that, "every park visitor deserved the best possible trip that we tour guides could give them." William F. Sydow, summer park guide in 1967 and 1968 remembered Claude telling the guides, "we have to give the visitors facts; we just can't joke around with them."

Claude stood for discipline, discipline perhaps acquired during WWII. Long-time elevator operator Mickey Prescott, in an oral history interview said, "Claude was in the cave all the time, making sure everything was going fine. He seemed everywhere; showing up in the caverns anywhere at anytime;

some guides almost thought that Claude could pop out of cave walls.”

Claude believed in appropriate consequences and fairness for the guides. Bill Sydow told me that during the first summer a tour guide worked at the caverns Claude wouldn't allow that guide to do extra cave night trips. In the second summer he allowed the night trips, but only for those guides who didn't call in sick the day after the trip.

When I worked for Olive Johnson in 1971, I remember the scheduled tours of several hundred (and sometimes more) visitors that we led through the Main Corridor and Scenic Rooms. Concerned with precision timing for the tours, Claude would stand far off in the distance of the cave, alerting us by flashlight signals to either slow or accelerate the pace of the tour as necessary. We tour guides were expected to bring the 1 ½ hour guided tour into the underground lunchroom precisely on schedule. Claude considered exact punctuality a professional responsibility to the visitors

Claude's professionalism, demeanor, and knowledge made him the logical choice to take VIPs through the caverns. In one instance, he escorted Supreme Court Justice William O. Douglas during his January 1966 visit here.

In all the oral history interviews that I have conducted with past employees or others who worked with or for Claude, I have never heard anything from those interviewees but respectful remembrances. Though seemingly stern, he was also constantly caring. Under Claude Fernandez's professional “wing” (his training and personal example), many tour guides went on to higher positions of responsibility. For example, Bill Jackson, a permanent tour guide in 1970 and 1971, recently retired as the superintendent of George Washington Carver National Monument, his second superintendent appointment.

Failing health required Claude to transfer to Chamizal National Memorial from Fort Union. Mr. Fernandez passed away on February 21, 1981 at the age of 58 in El Paso, Texas, leaving a wife, three sons, and a daughter. For those of us who worked with him at the caverns, Claude also left a legacy of “each and every day, doing the best we can, for the good of the caverns and for the good of the visitors.”

#### **Daniel Fernandez**



Daniel Fernandez

Daniel Fernandez was born on June 30, 1944 and joined the army at a young age. Like Claude Fernandez, Daniel became a combat soldier early in his military career. Unlike Claude, Daniel, unfortunately, would never have the opportunity to have a second career to perform service for others in.

On February 18, 1966, while on patrol, the 22-year old Specialist Fourth Class Fernandez and others were ambushed by a Viet Cong rifle squad. Under withering, unrelenting gun fire, Fernandez and the others retreated without the chance to evacuate a wounded sergeant. Acting quickly, Fernandez, another sergeant, and two volunteers, under more heavy fire, fought their way to the wounded sergeant.

Immediately the fighting turned fiercer. Suddenly an enemy grenade landed amidst the American soldiers. Realizing the grave and certain danger to everyone, Fernandez vaulted over the wounded sergeant, directly landing on the grenade. His body took the impact of the blast, saving the lives of the four other soldiers, while costing Fernandez his own life. The young man gave his life in the service of others. The United States government recognized Fernandez's gallantry and bravery by posthumously awarding him the Congressional Medal of Honor, the nation's highest military award.

Today when I think of Hispanic Heritage Month and “honoring our past,” I think of Daniel and Claude Fernandez, young men separated by time and place, but across the years, hardly out of high school, united in fighting for their country—performing service for others—significant contributions of the highest order. Both men put others first, with whatever time allotted to them.

The memories of Daniel and Claude Fernandez should be honored, wherever sacrifice and effort on the behalf of others matters, during Hispanic Heritage Month, or any time during the rest of the year.

### **CENTRAL OKLAHOMA GROTTO ATTACKS CAVE MUCK**

*by Tom Bemis*

Areas of Carlsbad Cavern's Big Room, blackened by splashing water from trail cleaning, are regaining their lost beauty, thanks to the efforts of the Central Oklahoma Grotto (COG). Led by Duane Del Vecchio, nine members of COG volunteered 63 hours on June 7, 2003 performing restoration tasks in the Big Room.

Trails throughout Carlsbad Cavern were regularly washed with garden hoses for a number of years. From this washing, a black material which was tracked in from the surface and worn from the soles of shoes, had accumulated on trails and was splattered on walls as high as three to four feet above the trail from these trail washings. While cleaning these grime-splattered walls has just begun, COG members have made a good first effort.





Members of COG prepare for work in Carlsbad Cavern. (Photo courtesy Central Oklahoma Grotto)

The group of cavers traveled from Oklahoma to spend a day on their hands and knees cleaning various areas of the Big Room, including the grime covered walls. The slow process required using sponges, scrub brushes, toothbrushes, water, and a lot of work to clean the areas.



Slow, tedious work is required to restore the walls. A COG member scrubs on the mud splattered wall in the Big Room. This wall is located along the paved trail and a couple of hundred feet before Mirror Lake.  
(NPS photo by Tom Bemis)



A cleaner, brighter wall emerges from the grime. (NPS Photo by Tom Bemis)

Other projects worked on by the group were removal of mud that had accumulated in a dry pond from the same trail washing project, and continuation of removal of mud remaining from an abandoned trail.



Mud is removed from a dry pond. (Photo courtesy of Central Oklahoma Grotto)

## STAY CALM

*by Kristin Dorman-Johnson*

One recent windy day I was going about my business collecting seeds along Walnut Canyon Road when I felt a light tickle on my left ear and assumed it was my hair so I reached up to brush it away. The tickling sensation quickly moved further into my ear canal. Within seconds of realizing I had an animal in my ear, my hearing was suddenly affected in my left ear and I heard and felt squishing noises.

Here's a little tip, should this ever happen to you, DON'T start screaming. First of all when you begin screaming, the visitors become distressed at the sight of a Park Ranger shaking and grabbing their head while screaming. Secondly the critter is sensitive to the vibrations your screaming produces, and begins to get very excited and seems to tap dance on top of your ear drum. Not only can you feel the tap dance but you HEAR each step of the tap dance.

I decided that calling an EMT on the radio to come and assist me was out of the question. I really didn't want to announce to the whole park that some insect was taking up residence inside my head. During the drive up Walnut Canyon I managed to convince myself that an enormous grasshopper or scarab beetle had nestled into my ear. I had horrifying images of scarab beetle legs dangling out of my ear. On top of it all I pictured myself attempting to fill out a CA-1 and trying to explain to the OWCP caseworker how I "accidentally" managed to get an insect lodged in my ear. And to help spur my now overworked imagination, my ear itched terribly and I felt movement inside my head with squishing sounds.



A simulation of what Kristen felt was in her ear. Don't try this at home.

As I entered the GIS office it was all I could do to rationally and calmly explain the situation to Dave Roemer. The best I could muster was to repeatedly inform him that he needed to get it out of my ear that very moment. I asked him to look into my ear and see if he could see it, and I assumed he would, because I was still imagining those dangling scarab beetle legs. Dave looked in my ear, and quickly took a step away

from me, looked me dead in the eye and said "Hmmm" and gave me a very helpless look that did not help my emotional state. Dave told me he couldn't see anything, which I assumed meant that he saw the legs and didn't want to tell me for fear of unleashing my barely contained hysteria. At this point the tickling seemed to be getting closer to the external part of my ear so I rushed to the bathroom to see what was coming out. I looked in the mirror I saw a very tiny black dot moving on my ear.

It was the smallest ant I had ever seen. I quickly got it off of my ear.

Now here is the helpful part. Should you find yourself being used and manipulated by a crazy insect in your ear, here is what to do:

- Remember that most damage to ears occurs when someone attempts to incorrectly remove an object.
- If the insect is tightly wedged in the ear, you should seek medical attention.
- Let the insect crawl out on its own. If this doesn't work, then see a doctor.

Here is what not to do:

- Don't stick anything at all into your ear. You may push the insect farther into your ear. This includes q-tips and tweezers.
- Don't use water to get a bean or seed out of your ear, because it may swell up and damage the ear.
- Don't try to tough it out. Use common sense and go to a doctor in a timely manner. If you delay getting to a doctor, the insect may lay eggs, bite or scratch your inner ear or even die and begin to decay in your ear. All these things can cause very serious ear conditions.

## THE PROMISED LAND

**A Significant New Discovery in Lechuguilla Cave**

*by Stan Allison*

**June 29, 2003** – At least four hours of fast travel from the entrance of this gargantuan cave, the four explorers carefully change from their dirty shorts, t-shirts and boots into clean clothes and white-soled aqua-socks. They place all of their dirty clothing, boots, survey gear, water, food and everything else they will need for the next 12+ hours of exploration into clean cave packs made of polyvinylchloride (PVC). All of these tasks are made more difficult by the five-foot high, 45° tilted passage they are occupying. Finally, they finish their painstaking work and are completely clad in clean cave clothes and clean non-marking footwear. They carefully enter and maneuver through a pristine flowstone and stalactite lined crawlway. At the end of this delicate crawlway they emerge into the Nativity Chamber, an extremely well decorated chamber with flowstone formations of all kinds and numerous small pools. After performing a detailed survey and inventory of the Nativity Chamber they enter an uninspiring crawlway and begin to survey and explore into the unknown. It has been



four years since they last entered the Nativity Chamber and the suspense of not being able to explore this area has almost killed several cavers in the intervening years. But now these four are about to satisfy both their own intense curiosity and those of the other explorers who have contributed to the 110+ miles of surveyed cave and who would dearly love to be on this trip as well.

**August 8, 1999** - It is the first day of survey and exploration on a weeklong camp trip into the Western Branch of Lechuguilla Cave. John Lyles, Peter Haberland, L.P. Lawrence and Daniel Chailloux are doing a routine mop-up survey at the end of the Western Borehole in the aptly named Keel Haul. Walking along the edge of a 200-foot long breakdown block that resembles an upside-down keel of a boat, they begin their survey (IBD survey) where other surveyors stopped in 1990. Methodically descending down into the breakdown, John Lyles leads the surveyors on what seems like a random route down through breakdown. Passing through several tight spots in the breakdown, the route initially seems unpromising. Further down the explorers find well-developed aragonite whose presence hints of airflow. Slowly the passage morphology changes from breakdown to solid bedrock and eventually the surveyors arrive in well decorated and going cave on the edge of the known cave! They end their survey and wearily begin the 2-3 hour trudge back to camp with their heads happily buzzing with the thoughts of what they have found and what they might find.



Part of the delicate passageway leading to the Nativity Chamber. (Photo © Daniel Chailloux)

*As the week progressed, numerous cavers contribute to the exploration of this new area named Northern Exposure. A large passage was found that was floored with delicate aragonite fronds and led to a corrosion residue lined breakdown passage and named Zanzibar. Over 3,700 feet of passage was surveyed in Northern Exposure. However, the most promising discovery was about to be made...*

**August 12, 1999** – Daniel Chailloux, Cathy Borer and Art Fortini begin their survey on the north end of Zanzibar. Surveying through some walking and stooping sized passages, they pop up into a nice room filled with gooey corrosion residue that they name Christmas in August. Continuing their survey to the north, they come to a pristine flowstone-lined

passage. Since Christmas in August has lots of corrosion residues, they must remove their dirty clothes and boots and wear clean clothes and aqua-socks to explore the flowstone lead. Carefully surveying across the flowstone at one point they have to squeeze between two delicate soda straws. It is a nerve-racking experience for one miss-step will result in a broken soda straw. As they crawl up the flowstone they soon arrive in an intensely decorated room with numerous small pools. They survey several shots into the room. As the room gets more profusely decorated and pools are encountered, the team stops surveying to discuss their dilemma. The explorer in them wants very badly to keep on surveying and find out where the passage goes. However, the park has plainly stated that when extremely sensitive areas are encountered such as pools or very delicate speleothems blocking the way, a team should stop rather than be in a rush and potentially impact an area more than necessary. After discussing their options the group makes a decision to stop exploration and consult with the Cave Resource Office.

*After the very successful expedition that led to the discovery of the Nativity Chamber, the next expedition discovered a bypass to the original flowstone-lined passage with low-hanging soda straws. The new bypass was still flowstone-lined and delicate, but not nearly so as the original route. Once again cavers stared into the unknown of the Nativity Chamber, but restrained themselves and refrained from further exploration in this area. Not long after the discovery of this bypass route, a trip was made by the personnel from the Cave Resource Office to assess the Northern Exposure area and the Nativity Chamber. Based upon their observations and discussions with the original explorers, future exploration through the Nativity Chamber was deferred until other leads in the area were more thoroughly explored in hopes of finding another less delicate route into passages that may be beyond the Nativity Chamber.*

*Late in 1999, all exploration and survey activities in Lechuguilla Cave came to a halt as the old galvanized steel culvert and gate were removed and replaced. In December of 2001, survey and exploration in Lechuguilla Cave resumed after the completion of the new airlock. Cavers began persistently looking for a bypass to the Nativity Chamber in the Keel Haul area as well as in Northern Exposure. A lot of cave was explored and surveyed, but unfortunately it did not lead beyond the Nativity Chamber. In 2003 the decision was made to continue the slow and careful exploration of the Nativity Chamber and the hoped-for passage beyond...*

**July 1st, 2003** – Art Fortini, Daniel Chailloux, Cathy Borer and Ron Miller continue their survey from where they left off the previous “day”. As there is no sun to set a schedule underground and travel times from camps to work areas are becoming longer, the cavers have extended both their waking time and sleeping time in order to increase their survey to travel time ratio. They left off the previous day in a small passage beyond the Nativity Chamber where the flowstone ends and the cave floor consists of corrosion residue and other debris. In order to maintain the pristine nature of the passages ahead, they wear tyvek booties across the dirty section and carefully pass their cave packs so that they do not touch the residue-covered area. Back into flowstone, the passage



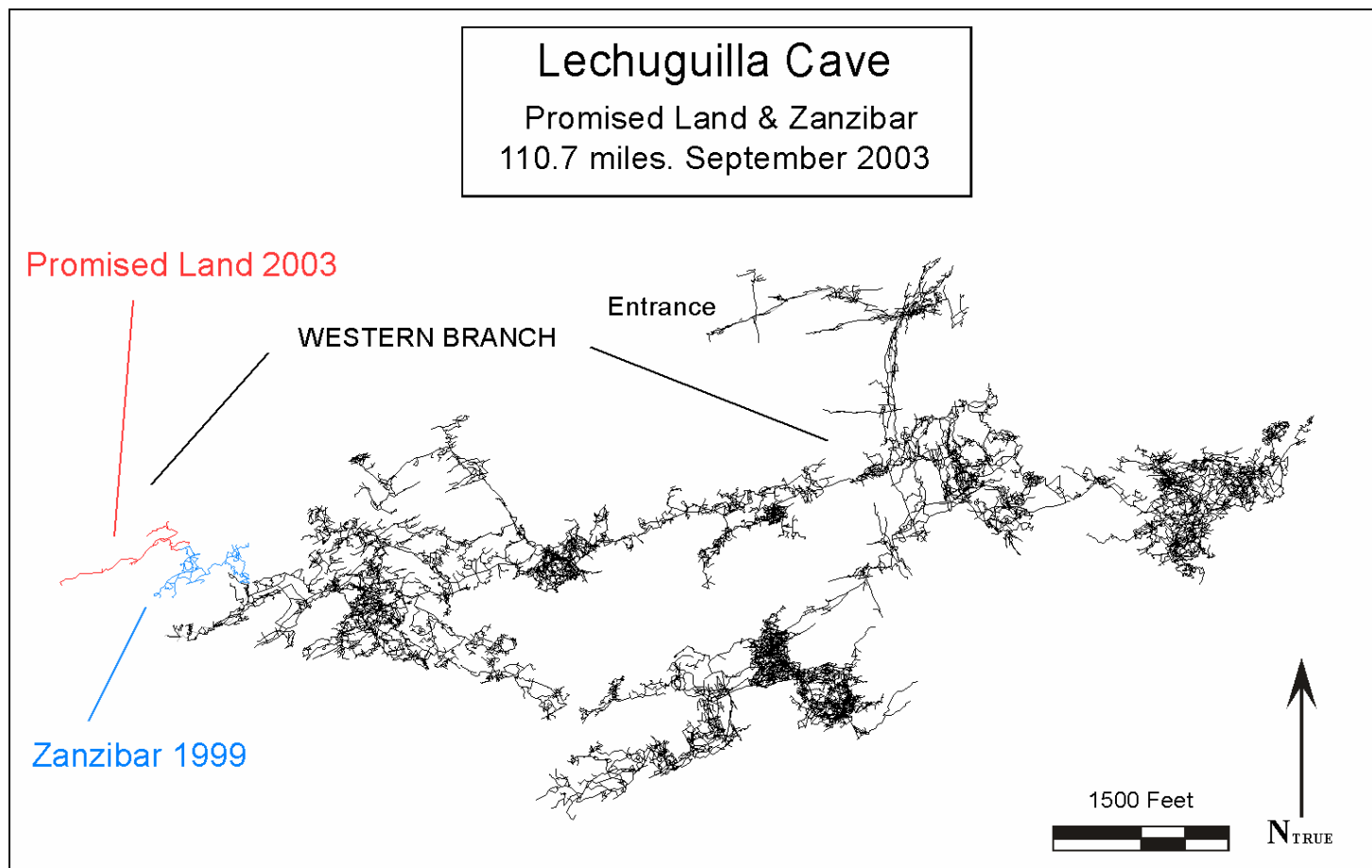
suddenly gets bigger, 40 feet wide and 12 feet tall! As they carefully make the first steps into this unexplored passage, they begin to notice 9-foot long soda straw stalactites, small pools and flowstone everywhere. Keeping in mind the Nativity Chamber theme they name this area Eden.

Beyond Eden, the passages start to become coated with corrosion residue. At this point the team laboriously switches from their clean clothing and boots to dirty clothes and dirty boots again. Not only do they have to change their gear, they also have to change their mindsets. Now they begin to focus on stepping only on the corrosion residue covered areas and not the flowstone, a reversal of the Eden and Nativity Chamber tactic. In addition, they are careful not to get debris on their clean packs since they have to go back through all of the clean passages on the way out of the area.

After transitioning to dirty gear, the team begins surveying further southwest and the passage gets larger as they go. At one point it becomes 100 feet wide and over 20 feet tall. Every survey shot the team takes is pushing the known extent of the

cave further west. The main passage is named The Congo and is explored to an end after rising almost 200 vertical feet. At this point the team is exhausted. They quit their survey and head back to camp. When the survey data is entered, they will find that The Congo has extended the western boundary of Lechuguilla Cave by 850 feet.

*Two more return trips were made to the area beyond the Nativity Chamber into what was called the Promised Land. A total of 2,568 feet were surveyed in the Promised Land. Another transition from clean gear to dirty gear is installed in order to maintain the pristine nature of this section of cave. Several unexplored leads remain in the Promised Land, although none are large. Future exploration of this area will follow this new level of minimum impact caving set by the original explorers and the Cave Resources Office staff. Exploration of this pristine area will be continued by small groups of explorers who are willing to continue the paradigm of careful exploration that places maintaining the pristine nature of the cave above any desire to explore hastily.*



Line plot map of Lechuguilla Cave showing the location of Zanzibar and newly discovered Promised Land.

(Plot by Stan Allison)